

III. REMARKS

In the Office Action, objection was made to claims 1, 8, 12 and 15 because of an alleged difference between the claimed subject matter and the teaching of the specification and the drawing.

Claims 1, 8, 12 and 15 were rejected under 35 U.S.C. 102 as being anticipated by Chong (US 6,590,946), and claims 10, 11, 14, 16 and 18 were rejected under 35 U.S.C. 103 as being unpatentable over Chong for reasons set forth in the Office Action. Other ones of the claims were rejected under 35 U.S.C. 103 as being unpatentable over various combinations of the cited art, namely, claims 2, 3, 9, 13 and 17 over Chong in view of Manjunath (US 6,456,964), claims 4-5 over Chong in view of Manjunath and Kleijn (US 6,223,151), claim 7 over Chong in view of Manjunath, Kleijn (US 6,223,151) and Kleijn (US 5,517,595), and claim 6 over Chong in view of Manjunath and Donovan (US 6,266,637) for reasons set forth in the Action.

In the foregoing rejections, the Examiner cites Chong as a new reference for rejection of the claims.

The following argument is presented to overcome the above-noted objections to the independent claims 1, 8, 12, and 15, and to overcome the foregoing grounds of rejection so as to present allowable subject matter in the independent claims as well as in their respective dependent claims.

The claim objections stated in page 2, paragraph 2 of the Detailed Action are traversed respectfully. The Examiner refers to the portion of the description where TD-PSOLA normalization is performed on the original speech signal. Claim 1, as well as other ones of the independent claims, call for a determining of an estimate of periodicity from the signal that has been formulated from the speech signal of a speaker. The estimate of the periodicity is then used in a subsequent step of modifying the aforementioned formulated signal. As set forth in claim 1, the step of modifying the formulated signal

improves the equality of a spacing of the pitch pulses. Thereafter, the step of determining the voicing parameter is performed based on the modified signal having the improved periodicity of the pitch pulses.

As noted in the present specification, in the paragraph linking pages 9-10, it is taught that, instead of determining the voicing information from the original signal, the voicing information is determined from normalized speech from which pitch jitter is effectively removed. This is in accord with the foregoing recital of claim 1, wherein an estimate of periodicity is used to modify the signal formulated from the speech uttered by a speaker, and wherein, subsequently, the modified signal is used for determining the voicing parameter. This was noted also by the examiner in the reference in the specification to page 12, lines 15-16; thus the voicing parameter decision is made based on the normalized signal. This is a feature in the invention that is called for by present claim 1, and shows that the recital of claim 1 is in agreement with the teaching of the specification. Accordingly, the objection should not have been raised by the examiner. A corresponding analysis applies to the other independent claims. Therefore, this analysis is believed to overcome the objection raised in Point 2 of the Action.

With respect to the rejections based on 35 U.S.C. 102 and 103, it is noted that Chong discloses a method for shifting peak instants of a digitized speech signal in the time domain. As depicted in Figures I and 2 of Chong, pitch pulses are detected from analysis frame data taken from an input sequence. Voicing data is classified from the input sequence as well, and a preliminary estimate of the signal period is calculated in a functional block performing "pitch and voicing analysis".

The voicing information as well as the locations of the pulses, prior to a shifting of the pulses, are directed to a block performing "mapping optimization". This block performs the transformation from the unshifted time-scale into the shifted (or "warped") time-scale. New sampling instants are calculated in view of the mapping parameters, and shifted sample values are calculated as well by using also the original analysis frame

data. Thus, shifted sample sequences with altered peak instants are achieved as an output signal.

It is emphasized that in Chong, the voicing parameter analysis is made to the signal before any modifications are performed to the signal. This is clearly seen in Figure 1 of Chong, where the voicing analysis results (block 103) are used in the warped sampling instant and sample value calculations (blocks 106, 107). Also in Chong, Figure 3 and its description clearly reveal that a signal segment is at first classified as voiced or unvoiced, and this affects the manner in which the warped peak instants are determined for the set of signal segments. To the contrary, the present invention performs the voiced/unvoiced decision after the signal is modified. This is clearly seen in page 9, lines 12-16 and page 9, line 30 - page 10, line 6 in the present specification.

The present invention, as set forth in the present claims, teaches one to modify the signal spoken by the speaker to obtain improved periodicity so that the voiced/unvoiced decision can be made more reliably and, thereafter, one is to perform the signal encoding with the most reasonable method according to the voicing parameter result. In other words, a purpose of the present invention is to improve the reliability of the V/UV decision for a speech signal. In contrast, the purpose of Chong is to change the pitch period to an approximately fixed value for improving the performance of e.g. speech signal compression or transmission over a digital communication channel.

Furthermore, it seems that any decision-making of an encoding method among several different methods is not mentioned in Chong. Thus, Chong is further distinguished from the presently claimed subject matter because of a difference in an order of the performed method steps in the teachings of the present invention and in the teachings of Chong; the respective procedures are very different from each other.

With respect to those claims rejected based on a combination of the teachings of Chong combined with the teachings of other ones of the cited references, it is noted that the

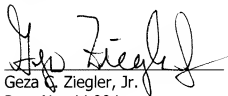
inclusion of the teachings of the other cited references does not alter the foregoing argument. Also, for reasons set forth in the remarks of the previous response, it is noted that these other references, such as Manjunath, and Kleijn '151, provide teachings that differ from the practice of the present invention so that there would be not motivation to combine these references with Chong.

Therefore, in view of the foregoing argument, it is urged that the rejections have been overcome to provide allowable subject matter.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,



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